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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,051	01/24/2001	Paul David Gootherts	10004801-1	2287

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HEWLETT-PACKARD COMPANY  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, CO 80527-2400

EXAMINER

NGUYEN, ANH T

ART UNIT	PAPER NUMBER
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2127

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DATE MAILED: 01/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/768,051

Applicant(s)

GOOTHERTS, PAUL DAVID

Examiner

Anh T Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 January 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claims 1-13 are presented for examination.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 3 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A. The following terms lack proper antecedent basis:

“the highest loaded” and “the lowest loaded” – Claim 7;

B. The claim language in the following claim is not clearly understood:

As per claim 3, line 3, it is unclear which steps applicant is referring to (i.e. there are determining step and transferring step).

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3, 5-10, and 12-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Brenner et al., USPN 6,658,449 (hereinafter Brenner).

6. As per claim 1, Brenner teaches the invention as claimed including a computer implemented method of load balancing comprising the following steps:

determining the state of each of two or more processors, wherein the state includes at least one of a source (i.e. at least one starving thread) and sink (i.e. no starving threads) state (FIG. 11, steps 1110 and 1140); and

if at least one of the two or more processors (abstract, line 8) is in a source state and at least one of the two or more processors is in a sink state (FIG.11, step 1140), transferring at least one thread from a queue of a source state processor to a queue of a sink state processor (FIG.11, step 1150).

7. As per claims 3 and 5, Brenner teaches wherein the method further comprises repeating said steps (FIG.11, return loop from 1160 to 1120) (or indefinite).

8. As per claim 6, Brenner teaches the method as claimed in claim 1, wherein the method further includes the following step:

determining the load of each of the two or more processors (col.12, lines 30-31).

9. As per claim 7, Brenner teaches the method as claimed in claim 6, wherein the transferring step further includes:

transferring at least one thread from the highest loaded, source state processor to the lowest loaded, sink state processor (col.12, lines 66-67, col.13, lines 1-2).

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10. As per claim 8, Brenner teaches a computer implemented method of load balancing a multiprocessor computer system, comprising the following steps:

determining a score (i.e. load factor) of each of two or more processors  
(col.7, lines 15-16, lines 28-29);

determining a best score (lowest load) processor and a worst score processor  
(highest load) (col.7, lines 15-16, lines 28-29); and

transferring at least one thread from a queue of a worst score processor to a  
queue of a best score processor (col.12, lines 66-67, col.13, lines 1-2)..

11. As per claim 9, Brenner teaches the method as claimed in claim 8, wherein the score is a function of at least a processor state (FIG.10, step 1040).

12. As per claim 10, Brenner teaches the method as claimed in claim 8, wherein the score is a function of at least a processor state and a processor load (FIG.10, step 1040).

13. Claim 12 is directed to a method of claim 1 with respect to a networked plurality of computer systems (FIG.1). Therefore, it is rejected for the same reasons as claim 1 set forth hereinabove.

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14. As per claim 13, it is a system claim of claim 1. Therefore, it is rejected for the same reasons as claim 1 set forth hereinabove.

In addition, Brenner teaches one or more processors for receiving and transmitting data (FIG.1, col. 9, lines 18-19) and a memory coupled to said one or more processors, said memory having stored therein sequences of instructions which (col.5, lines 53-55).

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 2, 4, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brenner et al., USPN 6,658,449 (hereinafter Brenner).

17. As per claim 2, Brenner teaches the method as claimed in claim 1. Brenner does not explicitly teach wherein the state further includes a neither state. However, one of ordinary skill in the art would recognize that a neither states exists where the processor is not currently starving any threads, but if one or more threads were added, the added threads would start to starve immediately.

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18. As per claim 4, Brenner does not explicitly teach wherein the method is initiated once every second. However, Brenner does teach periodic load balancing is performed every N clock cycles (col.7, line 9). One of ordinary skill in the art would recognize the need to perform load balancing periodically, including once every second, to avoid starvation.

19. As per claim 11, Brenner teaches the method as claimed in claim 10. Brenner does not explicitly teach wherein the processor state is weighted more heavily than the processor load. However, one of ordinary skill in the art would have recognized that the weight of the processor state is essential in determining execution failure of threads (i.e. starvation) in the field of load balancing.

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 6,247,121 and USPN 6,289,369, which disclose thread management and load balancing.


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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh T Nguyen whose telephone number is (703) 305-8649. The examiner can normally be reached on Monday-Friday from 7:00am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An, can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-5484.

Anh T. Nguyen   
Art Unit 2127  
January 23, 2004

  
MENG-AL T. AN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100